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Birthdate: December 18, 1932

Birthplace: Litchfield, Illinois

Academic Background

Degree	University	Year
Ph.D.	Fisheries, University of Washington	1967
M.S.	Fisheries & Wildlife, Michigan State University	1959
B.S.	Fisheries & Wildlife, Michigan State University	1958

Professional Experience

Fisheries Biologist, Montana Fish and Game, Great Falls, Montana, 1959-61

Pollution Control Biologist, Montana Board of Health, Helena, Montana, 1961-62

Aquatic Biologist, U.S. Geological Survey, Tacoma, Washington, 1964-67

Supervisor Biological Section, Tennessee Valley Authority, Chattanooga, Tennessee, 1967-68

University of Washington, Seattle, WA, Department of Civil and Environmental Engineering: Assistant Professor 1968-71; Associate Professor 1971-74 Professor 1974-1997; Professor Emeritus 1997- (teaching/research in limnology; water quality and pollutant effects)

Tetra Tech, Inc., Seattle, WA, (part time) 2000 -

Professional Societies

Society of Sigma Xi, University of Washington Chapter (Secretary 1973-74, President, 1974-75)

American Society of Limnology and Oceanography (President, Pacific Section, 1974-75)

International Society of Theoretical and Applied Limnology – current member

Water Environment Federation (Research Committee, 1976 and 1977)

North American Lake Management Society (Board Member 1980-85, 1982 Conf. Chair, Editorial Board 1986-1990; 1994-, President 1992-1993, Board Member 1992-1994) – current life member

Environmental Science and Technology (Editorial Advisory Board, 1983-85)

Washington State Lake Protection Association (President 1999-2000) – current member

Ecological Engineering (Editorial Board 1991- 2001)

Professional/consulting interests

Management of eutrophication and its effects in lakes, reservoirs and streams for recreational and water supply uses.

Thirty three years of research and consulting experience in assessing/interpreting/predicting the response of water bodies to nutrients and the effectiveness of lake restoration techniques with direct research experience on dilution/flushing, phosphorus inactivation with alum, wastewater diversion, wetland diversion, lake-level drawdown, and macrophyte harvesting.

Professional Consulting (Representative)

Brown and Caldwell Engr., 1977-1980, 20 days, analyses of lake restoration results and waste effects in an estuary.

WA Department of Ecology, 1978-79, 2.5 days, expert witness on algal bloom cause/effects.

URS Company, 1977-78, 1983-87, 23 days, lake restoration analyses.

Straam Engr., 1981, 2 days, waste effects analysis.

EPA, 1980-85, 25 days, lake restoration workshop, review of acid rain effects research and lake restoration and acid rain proposals.

Triad and Assoc., 1979, Subdivision Mngt., 1984-85, DR Strong, 1984, 6 days, anal. of lake response from development.

Entranco Engineers, Inc., 1987-88, 2 days, advised on University CSO and Lake Sammamish runoff control.

Williams, Eanza, Kastner and Gibbs, 1982, 2 days, expert witness and waste effect analysis; 1989 evaluation of effects of toxic metals from hazardous waste site.

Harper-Owes, 1985, 23 days, review waste allocation/W.Q. effects reports and Lake Chelan study.

R.W. Beck, 1985, 3 days, review and report preparation on acid rain effects.

Barry Robertson and Assoc., Jan. 1989, 3 days, Dunedin, NZ, advise on restoration of Hayes Lake, Queenstown.

Huie, Fernanbuco and Stewart Law Firm for Jefferson County, AL, 1989, 5 days, expert witness on water quality and recovery prospects following sewage diversion in Paradise Lake.

City of Lynnwood, WA, 1990, 2 days, evaluate restoration effectiveness for Scriber Lake.

EA Engineers, Walnut Creek and Sacramento, CA; 1992-2000, 275 days, evaluate/interpret data to predict quality changes in Klamath Lake, OR, as expert witness.

Kramer, Chin and Mayo, Seattle, 1992-1993, 1.5 days, evaluate restoration plans for Green Lake.

Mongomery-Watson and CH₂M-Hill, Bellevue, 1998, 6 days, evaluate water quality sampling modeling in Lake Youngs.

L.C. Lee Assoc., Seattle, 1991-1994, 26 days, advise on design of a small lake.

King County, Surface Water Mngt., 1995, 6 days, phosphorus modeling for Lake Sammamish.

Metcalf & Eddy-Hazen & Sawyer, NY, 1997-1999, 7 days, review plans for and results of in-lake treatments in a NY's Croton water supply reservoir.

Tetra Tech, Inc. and Gt. Lakes Environ. Center, 1997- 2001, 22 days, prepare nutrient criteria guidance manual for streams and rivers and provide advice for USEPA.

Barton & Loguidice, Syracuse, NY, 1998, 2 days, advise on algal control in water supply reservoirs.

Cherry Creek Water Quality Authority, CO, 1998-2000, 18 days, served on panel to evaluate past data and modeling approach to control reservoir water quality.

WA Department of Ecology, 1999-2000, 8 days, advised on effect of nutrient removal on river periphytic algae.

Janicki Environ. Inc., 2000, 8 days, evaluate results of an alum treatment.

Whatcom County, WA, 2000, 18 days, evaluated lake quality modeling approach.

Tetra Tech ISG, 2000, 30 days, evaluate data, guide water quality modeling and prepare report on management of Beaver Lake for King County, WA.

R2 Resources, Redmond, WA, 1999-2003; 145 days, evaluate/interpret data to predict quality changes in Klamath Lake, OR, as expert witness.

Recent Refereed Publications (* indicates senior author if not Welch)

2005:

“Wind control on water quality in shallow, hypereutrophic Upper Klamath Lake, Oregon”, *Lake and Reserv. Manage.* 21:149-158 (w/ J. Kann*).

2001:

“On determining the principal source of phosphorus causing summer algal blooms in Western Washington lakes”, *Lake and Reserv. Manage.* 17:55-65 (w/ J.M. Jacoby).

“Alternate stable states in a shallow lake dominated by *Egeria densa*”, *Verh. Internat. Verein. Limnol.*, in press, (w/ J.M. Jacoby* and I. Wertz)

2000:

“Amount of phosphorus inactivated by alum treatments in Washington lakes”, *Limnol. & Oceanogr.* 45:226-230 (w/ E. Rydin* and B. Huser)

“Environmental factors associated with a toxic bloom of *Microcystis aeruginosa*”, *Can J. Fish Aquat. Sci.*, 57:231-240 (w/ J. M. Jacoby*, D. Collier, J. Hardy and M. Crayton)

“Invertebrate grazing of filamentous green algae in outdoor channels”, *Verh. Internat. Verein. Limnol.*, 27: 2408-2414 (w/ E. L. Anderson, J. M. Jacoby, B. F. Biggs, and J. M. Quinn)

“Establishing nutrient criteria in streams”, *No. Amer. Benthological Soc.*, 19:186-196 (w/ W.K. Dodds*)

1999:

“Periphyton removal related to phosphorus and grazer biomass level.” *Freshwater Biol.*, 41:633-651 (w/ E. L. Anderson*, J.M. Jacoby, G. M. Schimek, and R.R. Horner).

“Dosing alum to Wisconsin lake sediments based on possible *in vivo* formation of aluminum bound phosphate”, *Lake and Reserv. Manage.* 15:324-331 (w/ E. Rydin*)

“Effectiveness and longevity of phosphorus inactivation with alum.” *Lake and Reserv. Manage.* 15:5-57 (with G.D. Cooke)

“Sample representativeness: A must for reliable regional lake condition estimates”, *Environ. Sci. & Tech.*, 33: 1559-1565 (w/ S.A. Peterson* and N.S. Urquhart)

1998:

“Stream Quality” in *River Ecology and Management: Lessons from the Pacific Coastal Ecoregion*. R.J. Naiman and R.E. Bilby (eds.), Springer-Verlag, p. 69-94, (w/ J.M. Jacoby and C.W. May).

“Dosage of aluminum to absorb mobile phosphate in lake sediments.” *Water Res.*, 32:2969-2976 (w/ E. Rydin*).

1997:

“Suggested criteria for stream trophic state: Distributions of temperate stream types by chlorophyll, total nitrogen and phosphorus.” *Water Res.*, 32:1455-1462 (with W.K. Dodds* and J.R. Jones).

“A zero degree of freedom total phosphorus model; 2. Application to Lake Sammamish, Washington.” *Lake and Reserv. Manage.* 13:131-141 (with W.W. Perkins*, J. Frodge and T. Hubbard).

“Response of cyanobacterial migration to an alum treatment in Green Lake.” *Arch. Hydrobiol.*, 140:373-392 (with J. Sonnicksen* and J.M. Jacoby).

“Pine Lake response to diversion of wetland inflow.” *Lake and Reserv. Manage.*, 13:302-314 (with J.M. Jacoby* and C.W. Anderson).

“Quality indices for urbanization effects in Puget Sound lowland streams.” *Dept. of Civil Engineering, Univ. Of Washington Water Res. Ser. Tech. Rep.*, No. 154 (with C.W. May*, R.R. Horner, J.R. Karr and B.W. Mar).

About 125 previous publications of which 95 were peer reviewed and in archival journals, as well as three editions of two books, the latest being: *Pollutant Effects in Freshwater: Applied Limnology* (Taylor and Francis, 2004), and *Restoration and Management of Lakes and Reservoirs* (CRC Press, 2005).